

# SCIENCE EXPERIEMENT GUIDEBOOK



## MAKING OBSERVATIONS

- Uses as many senses as appropriate to make observations.
- Uses quantitative and qualitative measurements with the appropriate tools and units of measure (metric), for example: pH, temperature, time, or distance.
- Based on fact, not opinion.
- Contains no inferences, judgements, or explanations.
- Uses appropriate vocabulary related to content.

## WRITING A TESTABLE QUESTION

- Asks: “ How does \_\_\_\_\_ affect \_\_\_\_\_?” “What is the effect of \_\_\_\_\_ on \_\_\_\_\_?”  
Or “ When I change \_\_\_\_\_ what happens to \_\_\_\_\_?”
- Has measurable variables
- Uses specific language
- Is sensible in terms of materials, time and space in the classroom or outdoors.
- Can be repeated by other scientists to verify results

# WRITING A HYPOTHESIS

- Hypothesis is a possible answer to the testable question
- Hypothesis is written as an If\_\_\_\_, then\_\_\_\_, because\_\_\_\_ statement

## CONSTRUCTING A DATA TABLE

- Data table is organized in a format of rows and columns.
- The left column represents the manipulated (independent) variable; the right column represents the responding (dependent) variable.
- Has a title that describes the relationship between the two variables
- Data table columns have headings showing the name of the variables
- Data table columns have the units of measurement inside parenthesis
- When there are multiple trials, the column for the responding variable is divided into separate sub-columns for each trial, including a column for “average” (**see EXAMPLE #2-BELOW**)
- When there are multiple trials, average is calculated by adding up all the data for the trials and dividing by the number of trials conducted
- When there are multiple trials, average is rounded to the nearest .1, or 1/10

### **EXAMPLE #1—**

THE RELATIONSHIP  
BETWEEN THE LENGTH OF  
THE DROP AND THE  
HEIGHT OF THE BOUNCE

Length of Drop (cm)	Height of Bounce (cm)
10	8
30	24
50	40
70	56
100	80

### **EXAMPLE #2, multiple trials—**

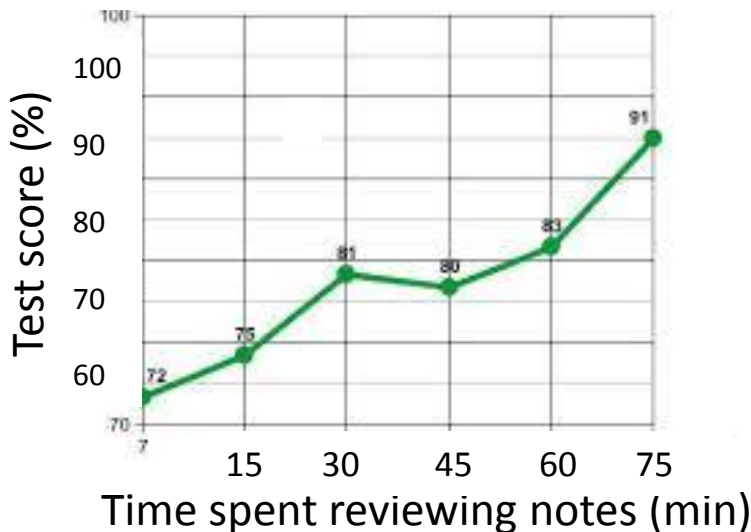
THE RELATIONSHIP BETWEEN THE  
AMOUNT OF SALT AND THE TIME IT TAKES  
TO DISSOLVE.

Amount Of Salt (g)	Time to Dissolve (sec)			
	trial1	Trial 2	Trial 3	Average
6	35	34	35	35
12	53	51	53	52
19	60	60	61	60
24	75	77	73	75
30	86	87	87	87

# CONSTRUCTING A GRAPH

- Graph has a title that describes the relationship between the variables
- The correct type of graph (pie, bar, line, etc) is chosen.
- Manipulated (independent) variable is displayed on the x-axis and the Responding (dependent) variable is displayed on the y-axis.
- The variable for each axis is clearly labeled
- The units of measurement are clearly and accurately displayed
- Each axis has evenly-spaced numbers and uses a consistent numbering system.
- Data points are clearly and accurately displayed on the x and y-axes.
- If appropriate, a key is used to identify data on the graph.

Example: The effect of study time on test scores



# WRITING CONCLUSIONS

- The conclusion is written in paragraph form, using complete sentences
- The conclusion summarizes what was done in the investigation.
- The conclusion answers the original “testable” question.
- The conclusion uses evidence (scientific data from the investigation) to support the claim
- Reasoning statements provide logical connections between the claim and evidence and include scientific concepts taken from other learning experiences.



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